Operation/Reference Guide

NXI

NetLinx® Integrated Controller

(No Master)

Central Controllers

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NXI NetLinx Integrated Controller

Overview

The NXI NetLinx Integrated Controller represents the new generation of AMX multi-port central controllers. The NXI can be programmed to control RS-232/422/485, Relay, IR/Serial, and Input/Output devices using the NetLinx programming language and NetLinx Studio program. Depending on your specific control needs, the NXI can be equipped with either a Master or Hub Card. For use as a master controller, the NXI accepts the NXC-ME260 NetLinx Master Card.

Front Panel

The NXI is equipped with a removable faceplate that covers the front panel components (FIG. 1):

FIG. 1 NXI front panel with faceplate installed

Remove the faceplate to see the front panel containing groups of colored LED indicators that light when their corresponding control ports receive/ transmit data (FIG. 2):

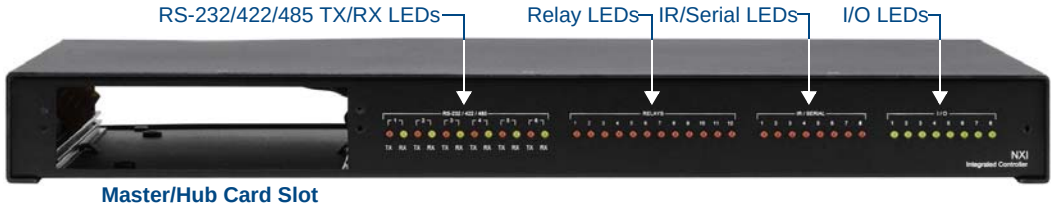

FIG. 2 NXI front panel with faceplate removed

These LEDs are grouped by control type, and are numbered according to their corresponding port (connector) numbers on the rear panel.

Rear Panel

The rear panel contains all of the port connectors, plus the ID pushbutton and ICSP LED (FIG. 3):

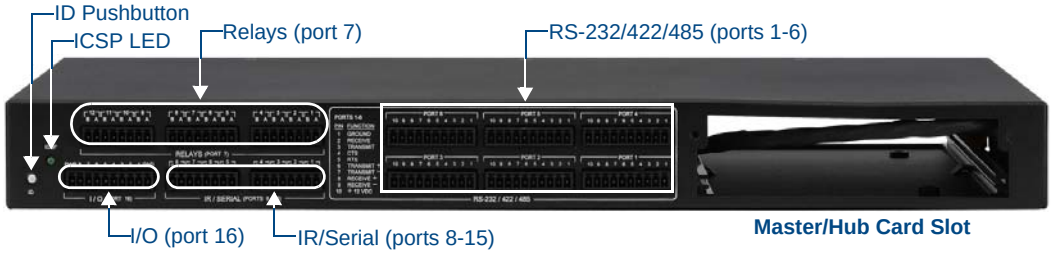

FIG. 3 NXI rear panel

Specifications

NXI Specifications	
Power requirements	1.09 A @ 12 VDC (NXI only/no card)
Memory	64K of IR memory:· • 32K IR memory for IR ports 8-11 • 32K IR memory for IR ports 12-15
Enclosure	Metal with black matte finish
Front faceplate	Plastic gray faceplate with translucent viewing window
Weight	4.10 lbs (1.85 kg)
Dimensions (HWD)	1.72" x 17.0" x 8.80" (43.68 mm x 431.80 mm x 223.52 mm)
Heat Dissipation:	44.7 BTU/hr (Typical)
Ports	
RS-232/422/485 ports (Ports #1-6)	Six RS-232/422/485 control ports with XON/XOFF (transmit on/transmit off), and CTS/RTS (clear to send/ready to send), 300-230,400 baud. Channel range = 1-255 • Channels 1-254 provide feedback only. • Channel 255 (CTS Push channel): Reflects the state of the CTS Input if a 'CTSPSH' command was sent to the port.
Relay port (Port #7)	12-channel relay port. Channel range = 1-12
IR/Serial ports (Ports #8-15)	8 IR/Serial control ports that support high-frequency carriers up to 1.14 MHz. Channel range = 1-32,767 • Channels 1-253 (output): IR commands. • Channel 254 (feedback): Power Fail (used with 'PON' and 'POF' commands). • Channel 255 (feedback): Power status (when IOLink is set).
I/O port (Port #16)	8-channel I/O port for contact closure, 0-5 VDC voltage sensing, or interactive power sensing for IR ports. Channel range = 1-8
Front Panel Components	
Card slot	Accepts NXC-ME260 NetLinx Master or Hub card. • NXC-NH - Hub Card • NXC-HS - Hub Server Card • NXC-HE - Hub Expander Card
RS-232/422/485 LEDs	6 sets of red and yellow LEDs light to indicate ports 1-6 are transmitting or receiving RS-232, 422, or 485 data: • TX LEDs (red) blink when transmitting data.· • RX LEDs (yellow) blink when receiving data.
Relay LEDs	12 red LEDs light to indicate relay channels 1-12 are active (closed).
IR/Serial LEDs	8 red LEDs light to indicate IR/Serial channels 1-8 are transmitting control data.
I/O LEDs	8 yellow LEDs light when I/O channels 1-8 are active.
Rear Panel Components	
ICSP LED (green)	Blinks in unison with the Master card's NetLinx LED indicating the ICSP bus is synchronized.
ID pushbutton	Sets the NetLinx ID (D:P:S) assignment for the NXI.
RS-232/422/485 ports (Ports #1-6)	Six 10-pin (male) connectors that support bi-directional RS-232/422/485 communication (XON/XOFF, CTS/RTS, 300-230,400 baud). • Channel range = 1-255 • Channels 1-254 provide feedback only.· • Channel 255 (CTS Push channel): Reflects the state of the CTS input if a 'CTSPSH' command was sent to the port.

NXI Specifications (Cont.)	
Rear Panel Components (Cont.)	
Relay port (Port #7)	Three 8-pin (male) relay connectors (normally open) that support up to 12 independent external relay devices. Each relay can switch up to 24 VDC or 28 VAC @ 1 A. • Channel range = 1-12
IR/Serial ports (Ports #8-15)	Two 8-pin (male) connectors that support IR or serial (wired) IR control. The 8 IR/Serial control ports support high-frequency carriers up to 1.14 MHz. • Channel range = 1-32,767 • Channels 1-253: = IR commands • Channel 254: = PowerFail (used with 'PON' and 'POF' commands) • Channel 255: = Power status (when IOLink is set)
I/O port (Port #16)	8-channel I/O port for contact closure, 0-5 VDC voltage sensing, or interactive power sensing for IR ports. • The 10-pin (male) connector has inputs that detect 0-1.5 VDC (low) as a Push, and 3.5-5 VDC (high) as a Release. • When used as an input, each of the eight I/O ports act as a switch to ground and are rated at 200 mA @ 12 VDC. • Channel range = 1-8
Certifications	FCC Part 15 Class B, CE, and IEC 60950
Included accessories	• 4 CC-NIRC emitters • Metal tab strips for commoning adjacent relays • Rack-mount brackets adapt for rack, wall, or shelf mounting • NetLinx faceplate
Optional accessories	• 12 VDC power supply • CC-N232 RS-232/422 cables • CC-NIRC IR cables • CC-NREL Relay cables • CC-NSER IR/Serial cables

Connections and Wiring

Installing the Master or Hub Card

The NXC-ME260 NetLinx Master or any Hub Card can be installed in the NXI. The card mounts in a horizontal position, through the master card slot on the rear panel of the NXI enclosure (see FIG. 3 on page 1).

To install a Master or Hub Card in an NXI:

1. Discharge the static electricity from your body by touching a grounded metal object.
2. Unplug all the connectors from the NXI.
3. Remove the two screws that hold the front plate on the Master or Hub Card, and remove the front plate.
4. Align the edges of the card with the guide slots inside the Master Card slot on the NXI.
5. Slide the card about halfway into the slot.
6. Inside the Master Card slot on NXI, locate the 6-pin control cable connector.
7. Plug the connector from the NXI into the 6-pin terminal on the Master or Hub Card. This connector is keyed to ensure correct orientation.
8. Once the control cable is connected, gently slide the card all the way in until you feel the rear edge of the card lightly snap into place.
9. Re-apply power and other connections as necessary.

Preparing/connecting captive wires

1. Strip 0.25 inch of wire insulation off all wires.
2. Insert each wire into the appropriate opening on the connector according to the wiring diagrams and connector types described in this section. Do not tighten the screws excessively; doing so may strip the threads and damage the connector.

RS-232/422/485 Wiring Specifications

The following table lists the wiring specifications for the RS-232/422/485 connectors (ports 1-6).

RS-232/422/485 Wiring Specifications

Pin	Signal	Function	RS-232	RS-422	RS-485
1	GND	Signal ground	X	X	
2	RXD	Receive data	X		
3	TXD	Transmit data	X		
4	CTS	Clear to send	X		
5	RTS	Request to send	X		
6	TX +	Transmit data		X	X (strap to pin 8)
7	TX -	Transmit data		X	X (strap to pin 9)
8	RX +	Receive data		X	X (strap to pin 6)
9	RX -	Receive data		X	X (strap to pin 7)
10	12 VDC	Power	optional	optional	

Relay Connections and Wiring

You can connect up to 12 independent external relay devices to the Relay connectors on the NXI (port 7).

- Connectors labeled A are for common; B are for output.
- Each relay is isolated and normally open.
- A metal commoning strip is supplied with each NXI to connect multiple relays.

IR/Serial Connections and Wiring

You can connect up to eight IR- or serial-controllable devices to the IR/Serial connectors (ports 8-15). These connectors accept an IR emitter (CC-NIRC) that mounts on the device's IR window, or a mini-plug (CC-NSER) that connects to the device's control jack. The IR/Serial connector wiring specifications are listed in the following table.

IR/Serial Connector Wiring Specifications

No.	Port	Signal	Function
1	8	GND (-) Signal 1 (+)	Signal GND IR/Serial data
2	9	GND (-) Signal 2 (+)	Signal GND IR/Serial data
3	10	GND (-) Signal 3 (+)	Signal GND IR/Serial data
4	11	GND (-) Signal 4 (+)	Signal GND IR/Serial data
5	12	GND (-) Signal 5 (+)	Signal GND IR/Serial data
6	13	GND (-) Signal 6 (+)	Signal GND IR/Serial data
7	14	GND (-) Signal 7 (+)	Signal GND IR/Serial data
8	15	GND (-) Signal 8 (+)	Signal GND IR/Serial data

Input/Output (I/O) Connections and Wiring

The I/O port responds to switch closures or voltage level (high/low) changes, or can be used for logic-level outputs.

You can connect up to eight devices to the I/O connectors (port 16). A contact closure between GND and an I/O port is detected as a Push. When used for voltage inputs, the I/O port detects a low (0-1.5 VDC) as a Push, and a high (3.5-5 VDC) signal as a Release. When used for outputs, the I/O port acts as a switch to GND and is rated at 200 mA @ 12 VDC.

The PWR pin (+12VDC @ 200 mA) is designed as a power output for the PCS2 or VSS2 (or equivalent).

The GND connector is a common ground and is shared by all I/O ports.

The following table lists the wiring specifications for the I/O connectors.

I/O Port Wiring Specifications

Pin	Signal	Function
1	GND	Signal GND
2	I/O 1	Input/output
3	I/O 2	Input/output
4	I/O 3	Input/output
5	I/O 4	Input/output
6	I/O 5	Input/output
7	I/O 6	Input/output
8	I/O 7	Input/output
9	I/O 8	Input/output
10	12 VDC	PWR

Programming

This section describes the Send_Commands, Send_Strings, and Channel commands you can use to program the NXI. The examples in this section require a declaration in the DEFINE_DEVICE section of your program to work correctly. Refer to the *NetLinx Programming Language* instruction manual for specifics about declarations and DEFINE_DEVICE information.

Using the ID Button

The ID Button on the rear panel of the NXI (FIG. 3 on page 1) is used in conjunction with the NetLinx Studio software program to allow you to assign new Device and System numbers for the NXI.

1. Using NetLinx Studio, place the system in Identity (ID) Mode. ID Mode means the entire system is put on hold while it waits for an event from any NetLinx device in the named system (for example, pushing the ID button on the NXI). The device that generates the first event is the identified device.
2. Press the ID Mode button to generate an event from the NXI and assign new device and system numbers in NetLinx Studio.

Device:Port:System (D:P:S)

A device is any hardware component that can be connected to an AXlink or ICSNet bus. Each device must be assigned a unique number to locate that device on the bus. The NetLinx programming language allows numbers in the range 0-32,767. Device 0 refers to the local master; numbers greater than 32,767 are reserved.

NetLinx requires a Device:Port:System (D:P:S) specification. This D:P:S triplet can be expressed as a series of constants, variables separated by colons, or a DEV structure. For example:

```
STRUCTURE DEV
{
INTEGER Number  // Device number
INTEGER Port    // Port on device
INTEGER System  // System the device belongs to
}
```

The D:P:S notation is used to explicitly represent a device number, port and system. For example, 128:1:0 represents the first port on device 128 on this system. If the system and Port specifications are omitted, (e.g. 128), system 0 (indicating this system) and port 1 (the first port) is assumed. Here's the syntax:

```
NUMBER:PORT:SYSTEM
```

where:

NUMBER:	16-bit integer represents the device number
PORT:	16-bit integer represents the port number (in the range 1 through the number of ports on the Controller or device)
SYSTEM:	16-bit integer represents the system number (0 = this system)

Program Port Commands

The Program port commands listed in the following table can be sent directly to the Master Card using a terminal program (i.e. Telnet). Be sure that your PC's COM port and terminal program's communication settings match those in the table below:

PC COM Port Communication Settings	
Baud	38400 (default)
Parity	None
Data Bits	8
Stop Bits	1
Flow Control	None

In your terminal program, type "Help" or a question mark ("?") and <Enter> to display the Program port commands listed in the following table.

Program Port Commands	
Command	Description
DATE	Displays the current date and day of the week.
DEVICE STATUS <D:P:S>	Displays a list of all active (on) channels for the specified D:P:S. Enter DEVICE STATUS without the D:P:S variable, the Master Card displays ports, channels, and version information.
DNS LIST <D:P:S>	Displays: • Domain suffix • Configured DNS IP Information
DOC FREE	Displays the total bytes of free space available on the Master Card's Disk on Chip.
ECHO OFF	Disables terminal character's echo (display) function.
ECHO ON	Enables terminal character's echo (display) function.
GET IP <D:P:S>	Displays the Master Card's D:P:S, Host Name, Type (DHCP or Static), IP Address, Subnet Mask, Gateway IP, and MAC Address.
MEM	Displays the largest free block of Master Card memory.
MSG OFF	MSG OFF disables the MSG ON display (see below).
MSG ON	MSG On sets the terminal program to display all messages generated by the Master Card.
OFF	Turns off a channel on a device. The device can be on any system the master you are connected to can reach. You can specify the device number, port, and system, or the name of the device that is defined in the DEFINE_DEVICE section of the program.
ON	Turns on a channel on a device. The device can be on any system the master you are connected to can reach. You can specify the device number, port, and system, or the name of the device that is defined in the DEFINE_DEVICE section of the program.
PASS	Sets up a pass through mode to a device. In pass through mode, any string received by the device is displayed on the screen, and anything typed is sent as a string to the device. The device can be on any system the master you are connected to can reach. You can specify the device number, port, and system, or the name of the device that is defined in the DEFINE_DEVICE section of the program. See *ESC Pass Codes* on page 10 for descriptions of the escape codes available in pass mode.
PING	Tests network connectivity to and confirms the presence of another networked device. It operates just like the PING application in Windows or Linux.
PROGRAM INFO	Displays the NetLinx program's name residing in the Master Card.
PULSE	Pulses a channel on a device on and off. The device can be on any system the master you are connected to can reach. You can specify the device number, port, and system, or the name of the device that is defined in the DEFINE_DEVICE section of the program.
REBOOT <D:P:S>	Reboots the Master Card or specified device.
RELEASE DHCP	Releases the DHCP setting for the Master Card.
SEND_COMMAND	Sends a command to a device. The device can be on any system the master you are connected to can reach. You can specify the device number, port, and system, or the name of the device that is defined in the DEFINE_DEVICE section of the NetLinx Program. The data of the string is entered with NetLinx string syntax.
SEND_STRING	Sends a string to a device. The device can be on any system the master you are connected to can reach. You can specify the device number, port, and system, or the name of the device defined in the DEFINE_DEVICE section of the NetLinx Program. The data of the string is entered with NetLinx string syntax.

Program Port Commands (Cont.)	
SET DATE	Prompts you to enter the new date for the Master Card. When the date is set on the Master Card, the new date will be reflected on all devices in the system that have clocks (i.e. touch panels). By the same token, if you set the date on any system device, the new date will be reflected on the system's Master, and all connected devices. This will not update clocks on devices connected to another Master (in Master-to-Master systems).
SET DNS <D:P:S>	Prompts you to enter a Domain Name, DNS IP #1, DNS IP #2, and DNS IP #3. Then, you enter Y (yes) to approve/store the information in the Master Card. Entering N (no) cancels the operation.
SET IP <D:P:S>	Prompts you to enter a Host Name, Type (DHCP or Fixed), IP address, Subnet Mask, and Gateway IP address. Enter Y (yes) to approve/store the information in the Master Card. Entering N (no) cancels the operation.
SET TIME	Prompts you to enter the new time for the Master Card. When the time is set on the Master Card, the new time will be reflected on all devices in the system that have clocks (i.e. touch panels). By the same token, if you set the time on any system device, the new time will be reflected on the system's Master, and all connected devices. This will not update clocks on devices connected to another Master (in Master-to-Master systems)
SET URL <D:P:S>	Prompts you to enter the URL address and port number. Enter Y (yes) to approve/store the new addresses in the Master Card. Entering N (no) cancels the operation.
SHOW DEVICE <D:P:S>	Displays a list of all devices present on the bus.

SHOW LOG	Displays the log of messages stored in the Master's memory. The Master logs all internal messages and keeps the most recent messages. The log contains:
	• Entries starting with first specified or most recent.
	• Date, Day, and Time message was logged.
	• Which object originated the message.
	• The text of the message:
	`SHOW LOG [start] [end]`
	`SHOW LOG ALL`
	• If *start* is not entered, the most recent will be first.
	• If *end* is not entered, the last 20 messages will be shown.
	• If *ALL* is entered, all stored messages will be shown, starting with the most recent.

SHOW NOTIFY	Displays a list of devices that other systems have requested input from and the types of information needed. Note that the local system number is 1061.
SHOW REMOTE	Displays a list of the devices this system requires input from and the types of information needed. When a NetLinx master connects to another NetLinx master, the newly connecting system has a device that the local system desires input from; the new system is told what information is desired from what device. Note the local system number is 1062.
SHOW ROUTE	Displays information about how this NetLinx master is connected to other NetLinx masters.
SHOW SYSTEM	Provides a list of all devices in all systems currently on-line. The system's lists are either directly connected to this master (i.e. 1 hop away), or are referenced in the DEFINE_DEVICE section of the NetLinx program. You may provide the desired system number as a parameter to display only that system's information (e.g. SHOW SYSTEM 2001). The systems listed are shown in numerical order.
TCP LIST	Lists all active TCP/IP connections.
TIME	Displays the current time on the Master Card.
URL LIST <D:P:S>	Displays the list of URL addresses programmed in the Master Card.

ESC Pass Codes

There are 'escape' codes in the pass mode. These codes can switch the display mode or exit pass mode. The following 'escape' codes are defined.

Escape Pass Codes	
Command	Description
+ + ESC ESC	**Exit Pass Mode:** Typing a plus (shift =) followed by another plus followed by an ESC (the escape key) followed by another escape exits the pass mode. The Telnet session returns to "normal".
+ + ESC A	**ASCII Display Mode:** Typing a plus (shift =) followed by another plus followed by an ESC (the escape key) followed by an 'A' sets the display to ASCII mode. • Any ASCII characters received by the device will be displayed by their ASCII symbol. • Any non-ASCII characters will be displayed with a \ followed by two hex characters to indicate the characters hex value.
+ + ESC D	**Decimal Display Mode:** Typing a plus (shift =) followed by another plus followed by an ESC (the escape key) followed by a 'D' sets the display to decimal mode. Any characters received by the device will be displayed with a \ followed by numeric characters to indicate the characters decimal value.
+ + ESC H	**Hex Display Mode:** Typing a plus (shift =) followed by another plus followed by an ESC (the escape key) followed by an 'H' sets the display to hexadecimal mode. Any characters received by the device will be displayed with a \ followed by two hex characters to indicate the characters hex value.

Notes on Specific Telnet/Terminal Clients

Telnet and terminal clients will have different behaviors in some situations. This section states some of the known anomalies.

Windows™ client programs

Anomalies occur when using a Windows client if you are not typing standard ASCII characters (i.e. using the keypad and the ALT key to enter decimal codes). Most programs will allow you to enter specific decimal codes by holding ALT and using keypad numbers.

For example, hold ALT, hit the keypad 1, then hit keypad 0, then release ALT. The standard line feed code is entered (decimal 10). Windows will perform an AnsiToOem conversion on some codes entered this way because of the way Windows handles languages and code pages.

The following codes are known to be altered, but others may be affected depending on the computer's setup.

Characters 15, 21, 22, and any characters above 127.

This affects both Windows Telnet and Terminal programs.

Linux Telnet client

The Linux Telnet client has three anomalies that are known at this time:

- A null (\00) character is sent after a carriage return.
- If an ALT 255 is entered, two 255 characters are sent (per the telnet RAFT).
- If the code to go back to command mode is entered (ALT 29 which is ^]), the character is not sent, but telnet command mode is entered.

LED Disable/Enable Send_Commands

The following commands enable or disable the LEDs on the NXI.

LED Send_Commands	

LED-DIS	Disables the LEDs.
	Issue this command to port 1 to disable all the LEDs on the NXI. When activity occurs on a port(s) or NXI, the LEDs will not light.
	Syntax:
	`SEND_COMMAND <DEV>,'LED-DIS'`
	Example:
	`SEND_COMMAND System_1,'LED-DIS'`
	Disables all the LEDs on the System_1 NXI.

LED-EN	Enable LEDs (default).
	Issue the command to port 1 to enable the LEDs on the NXI (default setting). When activity occurs on a port(s) or NXI, the LEDs light.
	Syntax:
	`SEND_COMMAND <DEV>,'LED-EN'`
	Example:
	`SEND_COMMAND System_1,'LED-EN'`
	Enables the System_1 NXI's LEDs.

RS232/422/485 Ports Channels

RS232/422/485 Ports Channels	
255	CTS push channel: Reflects the state of the CTS input if a 'CTSPSH' command was sent to the port.

RS-232/422/485 Send_Commands

RS-232/422/485 Send_Commands	

B9MOFF	Sets the port's communication parameters for stop and data bits according to the software settings on the RS-232 port (default). This command works in conjunction with the B9MON command.
	Syntax:
	`SEND_COMMAND <DEV>,'B9MOFF'`
	Example:
	`SEND_COMMAND RS232_1,'B9MOFF'`
	Sets the RS-232 port settings to match the port's configuration settings.

B9MON	Overrides and sets the communication settings on the RS-232 port to nine data bits and one stop bit. This command works in conjunction with the B9MOFF command.
	Syntax:
	`SEND_COMMAND <DEV>,'B9MON'`
	Example:
	`SEND_COMMAND RS232_1,'B9MON'`
	Resets the RS-232 port's communication parameters to nine data bits, one stop bit, and locks-in the baud rate.

CHARD	Sets the delay time between transmitted characters in 100 microsecond increments.
	Syntax:
	`SEND_COMMAND <DEV>,'CHARD<Time>'`
	Variable:
	Time: 0-255 in 100 microsecond increments
	Example:
	`SEND_COMMAND RS232_1,'CHARD10'`
	Sets a 1mS delay between all transmitted characters.

RS-232/422/485 Send_Commands (Cont.)	

CHARDM	Sets the delay time between transmitted characters in 1 millisecond increments.
	Syntax:
	`SEND_COMMAND <DEV>,'CHARDM<Time>'`
	Variable:
	Time: 0-255 in 1 millisecond increments
	Example:
	`SEND_COMMAND RS232_1,'CHARDM10'`
	Sets a 10 mS delay between all transmitted characters.

CTSPSH	Enables Pushes, Releases, and status information to be reported via channel 255.
	If Clear To Send (CTS) is high, the channel is on.
	Syntax:
	`SEND_COMMAND <DEV>,'CTSPSH'`
	Example:
	`SEND_COMMAND RS232_1,'CTSPSH'`
	Sets the RS232_1 port to detect changes on the CTS input.

CTSPSH OFF	Disables Pushes, Releases, and status information to be reported via channel 255.
	Turns CTSPSH off.
	Syntax:
	`SEND_COMMAND <DEV>,'CTSPSH OFF'`
	Example:
	`SEND_COMMAND RS232_1,'CTSPSH OFF'`
	Turns off CTSPSH on the specified device.

SET BAUD	Sets the RS-232/422/485 port's communication parameters.
	Syntax:
	`SEND_COMMAND <DEV>,'SET BAUD (Baud),(Parity),(Data),(Stop) (485 DISABLE/ENABLE)'`
	Variables:
	Baud = 150, 300, 600, 1200, 2400, 4800, 9600, 19200, 38400 (factory set default), 57600, 76800, 115200, 230400
	Parity = N (none), O (odd), E (even), M (mark), S (space)
	Data = 7 or 8 data bits
	Stop = 1 or 2 stop bits
	485 Disable = Disables RS-485 mode and enables RS-422.
	485 Enable = Enables RS-485 mode and disables RS-422.
	Example:
	`SEND_COMMAND RS232_1,'SET BAUD 9600,N,8,1 485 ENABLE'`
	Sets the RS232_1 port's communication parameters to 9,600 baud, no parity, 8 data bits, 1 stop bit, and enables RS-485 mode.

TSET BAUD	Temporarily sets the RS-232/422/485 port's communication parameters. TSET BAUD works the same as SET BAUD, except that the changes are not permanent, and the previous values will be restored if the power is cycled on the device. Syntax: `SEND_COMMAND <DEV>,'TSET BAUD (Baud),(Parity),(Data), (Stop) (485 DISABLE/ENABLE)'`

HSOFF	Disables hardware handshaking (default).
	Syntax:
	`SEND_COMMAND <DEV>,'HSOFF'`
	Example:
	`SEND_COMMAND RS232_1,'HSOFF'`
	Disables hardware handshaking on the RS232_1 device.

RS-232/422/485 Send_Commands (Cont.)	

HSON	Enables RTS (ready-to-send) and CTS (clear-to-send) hardware handshaking.
	Syntax:
	`SEND_COMMAND <DEV>,'HSON'`
	Example:
	`SEND_COMMAND RS232_1,'HSON'`
	Enables hardware handshaking on the RS232_1 device.

RXCLR	Clears all characters in the receive buffer waiting to be sent to the Master Card.
	Syntax:
	`SEND_COMMAND <DEV>,'RXCLR'`
	Example:
	`SEND_COMMAND RS232_1,'RXCLR'`
	Clears all characters in the RS232_1 device's receive buffer waiting to be sent to the Master Card.

RXOFF	Stops transmitting received characters to the Master Card (default).
	Syntax:
	`SEND_COMMAND <DEV>,'RXOFF'`
	Example:
	`SEND_COMMAND RS232_1,'RXOFF'`
	Stops the RS232_1 device from transmitting received characters to the Master Card.

RXON	Starts transmitting received characters to the Master Card.
	This command is sent automatically when issuing a CREATE_BUFFER SEND_COMMAND.
	Syntax:
	`SEND_COMMAND <DEV>,'RXON'`
	Example:
	`SEND_COMMAND RS232_1,'RXON'`
	Sets the RS232_1 device to transmit received characters to the Master Card.

TXCLR	Stops and clears all characters waiting in the transmit buffer.
	Syntax:
	`SEND_COMMAND <DEV>,'TXCLR'`
	Example:
	`SEND_COMMAND RS232_1,'TXCLR'`
	Clears and stops all characters waiting in the RS232_1 device's transmit buffer.

XOFF	Disables software handshaking (default).
	Syntax:
	`SEND_COMMAND <DEV>,'XOFF'`
	Example:
	`SEND_COMMAND RS232_1,'XOFF'`
	Disables software handshaking on the RS232_1 device.

XON	Enables software handshaking.
	Syntax:
	`SEND_COMMAND <DEV>,'XON'`
	Example:
	`SEND_COMMAND RS232_1,'XON'`
	Enables software handshaking on the RS232_1 device.

RS-232/422/485 Send_String Escape Sequences

RS-232/422/485 Send_String Escape Sequences	

27,17,	Sends device-specific break characters for a specified duration.
	Syntax:
	`SEND_STRING <DEV>,"27,17,<Time>"`
	Variable:
	Time = 1-255 in 100 microsecond increments
	Example:
	`SEND_STRING RS232_1,"27,17,10"`
	Sends a break character of 1 millisecond to the RS232_1 device.

27,18,1	Sets the ninth data bit to 1 on all character transmissions.
	You can use this escape sequence with the B9MON command.
	Syntax:
	`SEND_STRING <DEV>,"27,18,1"`
	Example:
	`SEND_STRING RS232_1,"27,18,1"`
	Sets the RS232_1 device's ninth data bit to 1 on all character transmissions.

27,18,0	Sets the ninth data bit to 0 on all character transmissions.
	You can use this escape sequence with the B9MON command.
	Syntax:
	`SEND_STRING <DEV>,"27,18,0"`
	Example:
	`SEND_STRING RS232_1,"27,18,0"`
	Sets the RS232_1 devices ninth data bit to 0 on all character transmissions.

27,19,	Inserts time delays before transmitting the next character.
	Syntax:
	`SEND_STRING <DEV>,"27,19,<Time>"`
	Variable:
	Time = 1-255 in 1 millisecond increments
	Example:
	`SEND_STRING RS232_1,"27,19,10"`
	Inserts a 10 millisecond delay before transmitting characters to the RS232_1 device.

27,20,0	Sets the RTS hardware handshaking output to Low/Inactive.
	Syntax:
	`SEND_STRING <DEV>,"27,20,0"`
	Example:
	`SEND_STRING RS232_1,"27,20,0"`
	Sets the RTS hardware handshaking output to Low on the RS232_1 device.

27,20,1	Sets the RTS hardware handshaking output to High/Active.
	Syntax:
	`SEND_STRING <DEV>,"27,20,1"`
	Example:
	`SEND_STRING RS232_1,"27,20,1"`
	Sets the RTS hardware handshaking output to High on the RS232_1 device.

IR / Serial Ports (8 - 15) Channels

IR / Serial Ports Channels	
00001 - 00229	IR commands.
00229 - 00253	May be used for system call feedback.
00254	Power Fail. (Used with the 'PON' and 'POF' commands).
00255	Power status. (Shadows I/O Link channel status).
00256 - 65000	IR commands.

IR/Serial Send_Commands

The following IR and IR/Serial Send_Commands generate control signals for external equipment.

IR/Serial Send_Commands	

CAROFF	Disables the carrier signal until a CARON command is received.
	Syntax:
	`SEND_COMMAND <DEV>,'CAROFF'`
	Example:
	`SEND_COMMAND IR_1,'CAROFF'`
	Stops transmitting IR carrier signals to the IR_1 port.

CARON	Enables carrier signals (default setting).
	Syntax:
	`SEND_COMMAND <DEV>,'CARON'`
	Example:
	`SEND_COMMAND IR_1,'CARON'`
	Starts transmitting IR carrier signals to the IR_1 port.

CH	Sends IR pulses to select a channel. All channels below 100 are transmitted as two digits.
	• If the IR code for ENTER (#21) is loaded, an Enter will follow the number.
	• If the channel is greater than or equal to 100, the IR function 127 is generated for the one hundred digit.
	Syntax:
	`SEND_COMMAND <DEV>," 'CH',<Number>"`
	Variable:
	Number = 0-199
	Example:
	`SEND_COMMAND IR_1," 'CH',18"`
	The NXI performs the following:
	• Transmits IR signals for 1 (IR code 11). The transmit time is set with the CTON command.
	• Waits until the time set with the CTOF command elapses.
	• Transmits IR signals for 8 (IR code 18).
	• Waits for the time set with the CTOF command elapses. If the IR code for Enter (IR code 21) is programmed, the NXI performs steps 5 and 6.
	• Transmits IR signals for Enter (IR code 21).
	• Waits for the time set with the CTOF command elapses.

CP	Clears buffered IR commands, and sends a single IR pulse. You can set the Pulse and Wait times with the CTON and CTOF commands.
	Syntax:
	`SEND_COMMAND <DEV>,"'CP',<Number>"`
	Variable:
	Number = 1-252 and 256-65,000 (253-255 reserved)
	Example:
	`SEND_COMMAND IR_1,"'CP',2"`
	Clears the active/buffered commands and pulses IR_1 port's channel 2.

IR/Serial Send_Commands (Cont.)	

CTOF	Sets the duration of off time (no signal) between IR pulses for channel and IR function transmissions. Off time settings are stored in non-volatile memory.
	The factory default for channel off time is 5 (.5 second).
	This command is associated with the SP (single pulse) and CP (clear pulse) commands.
	Syntax:
	`SEND_COMMAND <DEV>,"'CTOF',<Time>"`
	Variable:
	Time = 0-255 in tenths of a second increments
	Example:
	`SEND_COMMAND IR_1,"'CTOF',10"`
	Sets the off time between each IR pulse to 1 second.

CTON	Sets the total time of IR pulses transmitted, and is stored in non-volatile memory.
	Syntax:
	`SEND_COMMAND <DEV>," 'CTON',<Time>"`
	Variable:
	Time = 0-255 in tenths of a second increments; default = 5 (.5 second).
	Example:
	`SEND_COMMAND IR_1,"'CTON',20"`
	Sets the IR pulse duration to 2 seconds.

GET MODE	Polls the IR/Serial ports and reports the active mode settings to the device requesting the information.
	Syntax:
	`SEND_COMMAND <DEV>, 'GET MODE'`
	Example:
	`SEND_COMMAND IR_1,'GET MODE'`
	System response example:
	`PORT 4 IR,CARRIER,IO LINK 0`

IROFF	Halts and clears all IR output on the designated port.
	Syntax:
	`SEND_COMMAND <DEV>,'IROFF'`
	Example:
	`SEND_COMMAND IR_1,'IROFF'`
	Immediately halts and clears all IR output signals on the IR_1 port.

POD	Disables active PON (power on) or POF (power off) command settings.
	Channel 255 changes are enabled. This command is used in conjunction with the I/O Link command.
	Syntax:
	`SEND_COMMAND <DEV>,'POD'`
	Example:
	`SEND_COMMAND IR_1,'POD'`
	Disables PON and POF command settings on the IR_1 device.

IR/Serial Send_Commands (Cont.)	

POF	Turns off a device, based on input Link.
	• If at any time the IR sensor reads that the device is on (such as if one turned it on manually at the front panel), the card automatically attempts to turn the device back off.
	• If three attempts fail, the card will continue executing commands in the buffer.
	• If there are no commands in the buffer, the card will continue to try until a 'PON' or 'POD' command is received. If it fails to turn the device off, a PUSH and RELEASE is made on channel 254 to indicate a power failure error.
	• Channel 255 changes are disabled after receipt of this command.
	• You can only use the PON and POF commands when an IR device has a linked I/O channel.
	Syntax:
	`SEND_COMMAND <DEV>,'POF'`
	Example:
	`SEND_COMMAND IR_1,'POF'`
	Sends power down IR commands 28 (if present) or 9 to the IR_1 device.

PON	Turns on a device, based on input Link.
	• If at any time the IR sensor reads that the device is off (such as if one turned it off manually at the front panel), the card automatically attempts to turn the device back on.
	• If three attempts fail, card will continue executing commands in the buffer. If there are no commands in the buffer, the card will continue to try until a 'POF' or 'POD' command is received.
	• If it fails to turn the device on, a PUSH and RELEASE is made on channel 254 to indicate a power failure error.
	• Channel 255 changes are disabled after receipt of this command.
	• You can only use the PON and POF commands when an IR device has a linked I/O channel.
	Syntax:
	`SEND_COMMAND <DEV>,'PON'`
	Example:
	`SEND_COMMAND IR_1,'PON'`
	Sends power up IR commands 27 or 9 to the IR_1 port.

PTOF	Sets the time between power pulses in .10-second increments, and is stored in permanent memory.
	Syntax:
	`SEND_COMMAND <DEV>," 'PTOF',<Time>"`
	Variable:
	Time = 0-255 in tenths of a second increments; default = 15 (1.5 seconds).
	Example:
	`SEND_COMMAND IR_1," 'PTOF',15"`
	Sets the time between power pulses to 1.5 seconds for the IR_1 device.

PTON	Sets the duration of power pulses in .10-second increments.
	Time is stored in permanent memory.
	Syntax:
	`SEND_COMMAND <DEV>," 'PTON',<Time>"`
	Variable:
	Time = 0-255 in tenths of a second increments; default = 5 (.5 seconds).
	Example:
	`SEND_COMMAND IR_1," 'PTON',15"`
	Sets the duration of the power pulse to 1.5 seconds for the IR_1 device.

IR/Serial Send_Commands (Cont.)	

SET IO LINK	Links an IR or Serial port to an I/O channel for use with DE, POD, PON and POF commands.
	The I/O status is automatically reported on channel 255 on the IR port.
	Syntax:
	`SEND_COMMAND <DEV>,"'SET IO LINK <Number>'`
	Variable:
	Number = 1-8; set the I/O channel to 0 to disable I/O link settings.
	Example:
	`SEND_COMMAND IR_1," 'SET IO LINK 1'"`
	Sets the IR_1 port link to I/O channel 1. The IR port uses the specified I/O input as power status for processing PON and POF commands.

SET MODE	Sets the IR/Serial ports for IR or Serial-controlled devices connected to a Card Frame or NetModule.
	Syntax:
	`SEND_COMMAND <DEV>, 'SET MODE <Mode>'`
	Variable:
	Mode = IR or Serial
	Example:
	`SEND_COMMAND IR_1, 'SET MODE IR'`
	Sets the IR_1 port to IR mode for IR control.

SP	Generates a single IR pulse.
	You can use the CTON to set pulse lengths and CTOF for time off between pulses.
	Syntax:
	`SEND_COMMAND <DEV>," 'SP',<IR OUT>"`
	Variable:
	IR OUT = 1-252 and 256-65,000
	Example:
	`SEND_COMMAND IR_1, " 'SP',25"`
	Pulses IR code 25 on IR_1 device.

IR/Serial Send_Commands (Cont.)	

XCHM	Changes the IR output pattern for the XCH command.
	Syntax:
	`SEND_COMMAND <DEV>,'XCH-<Mode>'`
	Variable:
	Mode = 0-4
	Example:
	`SEND_COMMAND IR_1,'XCH 3'`
	Sets the IR_1 device's extended channel command to mode 3.
	Mode 0 Example (default): [x] [x] <x> <enter>
	`SEND_COMMAND IR_1, 'XCH 3'`
	Transmits the IR code as 3-enter.
	`SEND_COMMAND IR_1, 'XCH 34'`
	Transmits the IR code as 3-4-enter.
	`SEND_COMMAND IR_1, 'XCH 343'`
	Transmits the IR code as 3-4-3-enter.
	Mode 1 Example: <x> <x> <x> <enter>
	`SEND_COMMAND IR_1, 'XCH 3'`
	Transmits the IR code as 0-0-3-enter.
	`SEND_COMMAND IR_1, 'XCH 34'`
	Transmits the IR code as 0-3-4-enter.
	`SEND_COMMAND IR_1, 'XCH 343'`
	Transmits the IR code as 3-4-3-enter.
	Mode 2 Example: <x> <x> <x>
	`SEND_COMMAND IR_1, 'XCH 3'`
	Transmits the IR code as 0-0-3.
	`SEND_COMMAND IR_1, 'XCH 34'`
	Transmits the IR code as 0-3-4.
	`SEND_COMMAND IR_1, 'XCH 343'`
	Transmits the IR code as 3-4-3.
	Mode 3 Example: [[100][100]…] <x> <x>
	`SEND_COMMAND IR_1, 'XCH 3'`
	Transmits the IR code as 0-3.
	`SEND_COMMAND IR_1, 'XCH 34'`
	Transmits the IR code as 3-4.
	`SEND_COMMAND IR_1, 'XCH 343'`
	Transmits the IR code as 100-100-100-4-3.
	Mode 4:
	Mode 4 sends the same sequences as the CH command. Only use Mode 4 with channels 0-199.

XCH	Transmits IR code in the format set with the XCHM mode command. Syntax: `SEND_COMMAND <DEV>,'XCH <Channel>'` Variable: Channel = 0-999

ZAP HIGH	Deletes all IR data stored in the NXI ports 12-15.
	Syntax:
	`SEND_COMMAND <DEV>, 'ZAP HIGH'`
	Example:
	`SEND_COMMAND IR_4, 'ZAP HIGH'`
	Deletes IR commands in ports 12-15 of the IR_4 device.

IR/Serial Send_Commands (Cont.)	

ZAP LOW	Deletes all IR data stored in the NXI ports 8-11.
	Syntax:
	`SEND_COMMAND <DEV>, 'ZAP LOW'`
	Example:
	`SEND_COMMAND IR_1, 'ZAP LOW'`
	Deletes IR commands in ports 8-11 of the IR_1 device.

Input/Output Send_Commands

The following Send_Commands program the I/O ports on the NXI.

I/O SEND_COMMANDS	

GET INPUT	Gets the input channels active state.
	• An active state can be high (logic high) or low (logic low or contact closure).
	• Channel changes, Pushes, and Releases generate reports based on their active state.
	Syntax:
	`SEND_COMMAND <DEV>,'GET INPUT <CHAN>'`
	Variable:
	CHAN = 1-8
	Example:
	`SEND_COMMAND IO,'GET INPUT 1'`
	Gets the I/O port's active state.
	System response:
	`INPUT1 ACTIVE HIGH`

SET INPUT	Sets the input channel's active state.
	• An active state can be high (logic high) or low (logic low or contact closure).
	• Channel changes, Pushes, and Releases generate reports based on their active state.
	• Setting an input to ACTIVE HIGH will disable the output for that channel.
	Syntax:
	`SEND_COMMAND <DEV>,'SET INPUT <Channel> <State>'`
	Variable:
	State = LOW or HIGH
	Example:
	`SEND_COMMAND IO,'SET INPUT 1 HIGH'`
	Sets the I/O channel to detect a high state change, and disables output on the channel.

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